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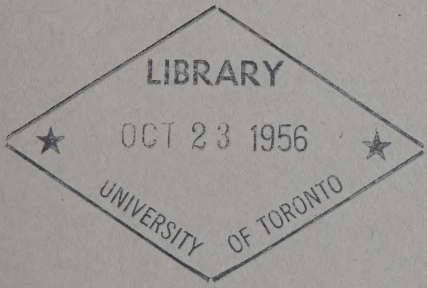
**Canada**  
**Department of Mines**  
**and Technical Surveys**



Annual Report of the

# **EXPLOSIVES**

# **DIVISION**



**Calendar Year**  
**1955**







**Canada**  
**Department of Mines**  
**and Technical Surveys**

**Report of the**

**EXPLOSIVES**  
**DIVISION**

**Calendar Year 1955**

**by**  
**H. P. Kimbell**  
**Chief Inspector**






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The function of the Explosives Division is to administer the Explosives Act, an Act respecting the manufacture, authorization, sale, storage, and importation of explosives. It also controls transportation by road.

### **Offices**

The Explosives Division maintains its main offices at 238 Sparks Street, Ottawa and branch offices at 739 West Hastings Street, Vancouver 1, B.C. and 7 Terminal Road, Halifax, N.S. All applications for Factory and Magazine Licences, Certificates for Registered Premises, and Permits to transport and import explosives should be addressed to the Chief Inspector of Explosives, Explosives Division, Department of Mines and Technical Surveys, 238 Sparks Street, Ottawa. The Division's testing laboratory is on the River Road near Uplands Airport, Ottawa.

### **Staff**

The year was marked by the retirement on superannuation of W. P. Campbell who had been Chief Inspector of Explosives since 1945. H. P. Kimbell, who has been on the inspection staff since 1944, was appointed to succeed him.

### **Legislation**

The only legislation during 1955 consisted in the addition of Part XV to the Explosives Regulations. This Part, passed by Order-in-Council P.C. 1955-535, 20 April, 1955, serves to define "explosives under the direction or control of the Minister of National Defence" which explosives have always been excluded from jurisdiction under the Explosives Act by Section 3 thereof. Part XV was added because the Department of National Defence submitted that, under certain conditions, it was desirable that the Act should apply to defence explosives. The most significant change introduced by Part XV is that which concerns transportation by road; the Act now applies to any vehicle carrying defence explosives unless such vehicle is owned by the Department of National Defence or is under the supervision of an employee of that Department.

It may be useful to list the Parts of the Regulations made under the Act. They are as follows:

Part I.....	Classification of Explosives.
Part II.....	Authorization and Testing.
Part III.....	Licences, Permits and Certificates.
Part IV.....	Manufacture of Explosives.
Part V.....	Packing for Transportation by Road.
Part VI.....	Transportation by Road and Private Railway.
Part VII.....	Factories for Explosives.
Part VIII.....	Magazines for Explosives.
Part IX.....	Magazines for Fireworks.
Part X.....	Sale of Explosives.
Part XI.....	Amount of Authorized Explosive that may be kept in Registered Premises, and the Manner in which it shall be Handled and Stored.



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- Part XII.....Storage and Handling of Ammunition and Fireworks.  
Part XIII.....Amount of Authorized Explosive that may be kept for Use and not for Sale in Places other than Licensed Factories and Licensed Magazines and Registered Premises and the Manner in which it shall be Handled and Stored.  
Part XIV.....Importation of Explosives.  
Part XV.....Explosives under the Direction or Control of the Minister of National Defence.

These various Parts are printed separately and copies of any or all of them may be obtained by application to the Chief Inspector.

### ***Manufacture***

The list of licensed factories is shown in Appendix A. There are two more than last year. The Canadian Arsenal's factory at Beloeil has not been in operation since the war, the licence being held on a stand-by basis.

The DuPont Company of Canada announced that a factory would be established near North Bay, Ontario. The site has been approved by the Division and other relevant matters have been discussed at various interviews with company officials. It is expected that production will commence in 1957.

Production of commercial blasting explosives in 1955 was 130,643,348 pounds. This constitutes a record. The figure includes "Nitrone" explosives but does not include trinitrotoluene, nitrocotton and nitroguanidine for military purposes, export or incorporation in commercial explosives. Division inspectors carried out forty-three inspections of licensed factories in 1955. All factory licensees are anxious to maintain safe conditions and their co-operation in efforts to observe the Terms of Licences is excellent.

### ***Authorization***

Before they may be manufactured in, or imported into Canada, all explosives must be declared authorized by the Minister of Mines and Technical Surveys. A complete list of authorized explosives is given in Appendix D. There were numerous additions in 1955. Noteworthy is the authorization of "Amex" (previously designated BL-109), an ammonium nitrate explosive of comparatively low sensitivity, the manufacture of which was commenced in a new factory at Seven Islands, Quebec.

Chinese firecrackers are in a special category with regard to authorization. No shipment is authorized until it has been examined at the port of entry. This should be carefully considered by any who propose to import these goods. It was necessary to reject a large proportion of one shipment during 1955. Since no other market could be found, the importer found it necessary to destroy the rejected firecrackers.

Loss was also sustained by two companies who imported toy pistol caps from Japan. These contained a composition which could not be authorized. The Explosives Act definition of "explosive" includes fireworks of all descriptions and any one contemplating importation would be well advised to communicate with the Division before placing an order.



### ***Storage of Explosives***

**For Sale** With very few exceptions the Act forbids the storage of explosives for sale without a magazine licence or registered premises certificate. The latter provides for the dealer in small quantities only; the maximum allowed by a certificate is 175 pounds of blasting explosives and 6,000 detonators.

Magazine licences in force during 1955 numbered 466; this compares with 472 in 1954. There were 108 registered premises certificates, an increase of two.

**For Private Use** The maximum quantities that may be stored for private use without a licence are 150 pounds of blasting explosives and 2,000 detonators. Temporary Magazine licences are issued to cover the larger quantities required for construction projects, logging, oil exploration, etc. The number of such licences issued in 1955 was 924 compared with 888 in 1954.

Those who store the small quantities that do not require possession of a licence are required to observe the safe conditions set forth in Part XIII of the Regulations. Such persons are made known to Inspectors by examination of the sales records that must be kept by vendors, i.e. holders of magazine licences and registered premises certificates.

The province of New Brunswick, having passed revised Regulations under its Mining Act, advised the Division that licensing of mining magazines under the Explosives Act was no longer necessary. Magazine licences in New Brunswick therefore, when the explosives are for sole use in mines or quarries, are being allowed to lapse as they expire. This is in accordance with Section 2(h) (i) of the Act, which eliminates mining magazines from its jurisdiction, when there is efficient inspection under the provincial Mining Act.

### ***Imports***

Excepting small quantities of sporting ammunition, no explosive may be imported without an explosives import permit. Statistics of the 1955 imports are shown in Appendix B; they were made under authority of 1,028 general permits and 25 annual permits, an increase of 230 over 1954. This increase is largely the result of the new regulation that requires a permit for importation of safety cartridges when the number of rounds in the shipment exceeds 2,000. It should be noted also that this new regulation, which became effective 31 March 1954, adds the item "Safety Cartridges" to Appendix B.

### ***Transportation***

The year 1955 was the first in which revised regulations were in force. These require possession of an explosives transportation permit for any vehicle carrying a load of explosives exceeding 4,000 pounds. The maximum that may be carried in any vehicle, however, is 10,000 pounds.

There were 156 permits issued during the year and holders of permits have, on the whole, been very co-operative. Automotive dealers have been

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helpful in supplying details of truck specifications required in checking applications for permits. The opinion has been expressed that the public safety has benefited by the new regulations because of the tendency to reduce the number of casual carriers in favour of experienced operators.

### ***Inspection***

The following inspections were made:

Factories.....	43
Magazines.....	1,705
Registered Premises.....	142
Transportation.....	46
Unlicensed Premises (Explosives Regulations Part XIII).....	122

These figures include inspections by the R.C.M.P. who are all appointed Deputy Inspectors of Explosives under the Act. Their presence as the policing authority in the Yukon and Northwest Territories, and in eight of the ten provinces, makes possible much useful inspection and re-inspection of magazines.

The inspections of unlicensed premises are made possible as the result of examination of the sales records that are required to be kept by vendors. Time does not allow visiting all purchasers, of course, but those who cannot be visited are apprised of the regulations by letter.

### ***Destruction of Explosives***

The Division is responsible for ensuring the safe disposal of abandoned or deteriorated explosives. The 1955 records show destruction of 20,497 pounds of blasting explosives, 4,412 detonators, and approximately 1,225 pounds of unauthorized fireworks.

In the Northwest Territories, a quantity of 4,100 pounds of blasting explosives, the surplus left behind by a mining company, was destroyed by an inspector.

In Newfoundland, 4,250 pounds of blasting explosives, condemned by the R.C.M.P., were destroyed by the owner.

A construction company in eastern Quebec destroyed 2,500 pounds of blasting explosives that had been condemned by an inspector.

A pulp and paper company in northern Quebec disposed of 4,650 pounds of deteriorated dynamite by dumping it into a river. This method of "destruction" was not authorized and is certainly not approved. Nitro-glycerine is of course not destroyed by immersion in water; elimination of future hazard is therefore not certain. Burning or detonation, under careful precautions, are the only sure methods of destruction.



### *Thefts*

Ten magazines and six unlicensed premises were broken into and approximately 1,400 pounds of blasting explosives and 2,100 detonators were stolen. Police recovered some of the stolen explosives.

Security of magazines and receptacles for explosives is a most vital matter. There should be no openings except ventilators and door; the latter should be substantial and should be provided with a secure locking arrangement. It has been frequently noted by inspectors that hinges of magazine doors are attached by screws. Unlawful entry under these conditions is quite easy and can be made without undue noise. Door hasps and hinges should be securely affixed by means of bolts.

### *Explosives Abandoned*

There were 22 reports of explosives being found abandoned, involving 1,218 pounds of blasting explosives and 459 detonators. These explosives were either deliberately abandoned by their owners when they had no further use for them, or had been cached for future use and then forgotten. In either case the neglect is inexcusable. Such explosives are a menace to public safety and every attempt is made to find and, if necessary, prosecute those responsible. Abandoned explosives are usually destroyed but if in good condition are given to capable persons for disposal by use.

### *Laboratory*

Tests and analyses of explosives, as required in the administration of the Act (Explosives Regulations Part II), also investigation of the hazards attending manufacture, storage, transportation, and use of explosives were carried out by Division chemists. Assistance was also given to other government departments in matters concerning explosives; for instance, a member of the staff serves on the Dangerous Goods Committee of the Board of Steamship Inspection, Department of Transport.

Samples examined were classified as follows:

Blasting Explosives.....	28
Fireworks.....	473
Miscellaneous (including samples submitted by Police, Department of National Defence, and Post Office Department).....	44
Total.....	545

The program involving Bichel Gauge testing of all Canadian explosives used underground in "hard-rock" mines was completed and all such explosives have been classified with respect to poisonous fumes emitted

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on detonation. Based on the fume classification established by the Institute of Makers of Explosives and the United States Bureau of Mines, results are as follows:—

Brand	Fume Class
Driftite 70%.....	1
Cilgel 50%.....	1
Dygel 75%.....	1
Forcite 30%, 35%, 40%, 50%, 60%, 75%, 80%.....	1
Giant Gelatin 20%, 25%, 30%, 35%, 40%, 50%, 60%	1
Giant Gelatin 75%.....	2
Stopeite 40%, 55%.....	1

The Chief Inspector submitted a report on this work to the Mines Ministers' Conference held in September, so that possible legislation under the various provincial Mining Acts might be considered. The use of explosives in mines is of course a matter for provincial jurisdiction.

### Prosecutions

Prosecutions for violations of the Act and Regulations were instituted in 18 cases; there were 17 convictions and one case is pending. Examples follow:—

A magazine licensee was fined \$50 and costs for storing explosives in larger quantities than allowed by terms of licence, and for storing explosives elsewhere than in the magazine. There were two other convictions for similar offences.

An employee of a licensed factory was fined \$25 and costs for possession of matches in a prohibited area.

A construction company was fined \$200 and costs for storing explosives elsewhere than in a licensed magazine, and for keeping dynamite and detonators together.

Three firms were fined for failure to observe requirements of safe road transportation as laid down in Explosives Regulations Part VI.

A transportation company and one of its employees were fined when they submitted false information on an application for an explosives transportation permit.

Following an explosion and accident at the end of 1954, a contractor was fined \$150 and costs for storing explosives in a building containing an oil stove, and for failure to observe the terms of his magazine licence.

Five persons and companies were convicted of illegal storage. One defendant chose to take the alternative of a jail term and served eight days.

In addition to the prosecutions under the Explosives Act, a man in Yukon Territory was convicted under the Criminal Code and sentenced to 14 days in jail for negligent disposal of explosives. He had given gunpowder to boys for destruction on his behalf and a serious accident resulted when the boys played with it.



## Accidents

An analysis of the total reported accidents with explosives in 1955 is shown in Appendix C, Part I. The following shows the comparison with recent years:—

	Accidents	Killed	Injured
1952.....	129	45	135
1953.....	127	29	149
1954.....	132	15	151
1955.....	112	22	119

**In Manufacture** Accidents in manufacture numbered 25, and involved 13 cases of injury but no fatalities. It is worth recording that there have been no fatalities in dynamite manufacture for 9 successive years, and none in detonator manufacture for 3 years. A brief summary of accidents in manufacture follows:

*At a detonator factory, an employee suffered lacerations to his hand when an electric blasting cap he was preparing for test-firing exploded.*

*At a small arms ammunition factory, a man sustained a wound to his hand when some priming composition exploded. Investigations were conducted and precautionary measures to prevent a recurrence were taken.*

*On an assembly line in a shell-filling plant, one mortar bomb struck the primer of another, causing it to fire and ignite the propellant charge. Seven men sustained slight cuts about the face and hands from flying debris.*

*An operator at a shell-filling factory sustained multiple puncture wounds on both hands and forearms when pressing a filled cup charge of primer on to the styphnate-filled bridge assembly. The explosion was probably caused by friction of loose explosive adhering to the walls of the cup. Changes were made in the operation to give better protection to the operator.*

*An operator at a fireworks factory suffered fairly severe burns when he was filling roman candles. The ignition was apparently caused by excessive friction and this in turn may have resulted from off-size tubes or failure to place the star properly in the star plate.*

*At a shell-filling factory, an accident resulted when several primers fired during an inspection operation. One operator suffered severe injuries to both hands, and a second received minor injuries. At the enquiry which followed, evidence indicated that static electricity was the probable cause of the accident and that the operator was not wearing the grounding bracelet required by regulations.*

**In Use** Accidents in use numbered 60, and involved 16 killed and 67 injured. The 1954 statistics were 70 accidents, 12 killed and 72 injured.

Of the 60 accidents, 38 occurred in mines and quarries, and 22 elsewhere, such as construction, logging, farming, etc.

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The causes of these accidents always follow a fairly general pattern. These causes are listed in the Table of Appendix C, Part I. Drilling into explosives, projected debris, delaying too long in lighting fuse, and returning too soon after blasting are the commonest causes and account for 37 of the 60 accidents. Using too short fuse, and not taking proper cover account for 8 more.

While the Act does not directly control the use of explosives, the Division can and does spread safety precepts by distributing such booklets as *The Handling of Explosives* and *The Storage of Explosives*, chiefly to magazine licensees. During the year an attempt was made, in addition, to reach the casual user of small quantities—the person who buys a few sticks of dynamite and a few detonators from his local dealer. Many accidents can be traced to consumers of small quantities of explosives, largely because of ignorance or careless handling. A folder entitled *Safety with Explosives* was published and copies have been distributed to licensed dealers. It is hoped that the latter will in turn distribute them judiciously to purchasers who may benefit.

**In Conveyance** Accidents in conveyance, of which 3 were reported, fortunately did not involve fire or explosion. In view of the continuing increase in highway traffic density and accident rate, it behooves all who transport explosives by road to observe with great care the safety requirements of Explosives Regulations Part VI. It is considered worth while to briefly describe the three accidents.

*A truck loaded with 2,000 pounds of dynamite skidded on an icy road and struck an oncoming automobile. The latter was considerably damaged and a passenger suffered a minor injury. The driver of the truck was not injured, although the truck fender and grill were damaged; the dynamite was, fortunately, not exploded.*

*A vehicle loaded with 4,000 pounds of dynamite left the highway in the early hours of the morning and came to a stop in a ditch near an occupied house. The driver apparently fell asleep, having driven over 580 miles in a period of something over 17 hours. There were no injuries and the explosives were not affected. It should be noted that the regulations require the presence of two licensed drivers when a journey is to exceed 10 hours.*

*Because suitable and legal storage was not provided at a job site, detonators were being carried about in a truck. The vehicle became involved in an accident and the detonators were scattered when the vehicle rolled down an embankment. There was no explosion.*

**Miscellaneous** Accidents grouped under the *miscellaneous* heading numbered 24, involving 6 killed and 39 injured. All of these accidents are briefly described in Appendix C, Part II.

Accidents with home-made explosives continue to take a toll and nearly always involve boys of high-school age. The sequence of events usually follows a familiar pattern:

- (a) An explosive is prepared by mixing an oxidizing agent with a fuel;
- (b) The mixture is rammed into an iron pipe closed at one end, and
- (c) The "bomb" or "rocket" thus made is ignited.



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Some of the mixtures are dangerously sensitive and the accident happens before stage (c) is reached. One 1955 accident resulted in loss of speech by a boy who sustained serious throat injuries. Parents of boys who are interested in chemistry would do well to supervise their activities closely and to discuss the nature of their experiments.

One fireworks accident is a tragic example of how a joyful celebration can be turned into disaster.

*At a family gathering it was decided to set off some fireworks and in attempting to discharge an aerial shell an explosion resulted which killed one and seriously injured 5.*

Fireworks are classified either as "shop goods" or "display goods". The latter, including aerial shells, are of the type that is fired at exhibitions under controlled conditions. This type should never be fired by other than thoroughly experienced operators.

The accidents resulting from playing with explosives would be largely eliminated if the Explosives Act Regulations were fully observed. Explosives should always be stored under lock and key; any relaxation of this rule invites serious accident. Frequently the casual user, such as a farmer, is to blame because he does not dispose of a small quantity of explosives remaining after a job such as stumping or breaking rocks. Any such surplus explosive should be returned to the supplier or carefully destroyed by someone who knows how. The human tendency to keep things "because they may come in handy in future" should always be resisted where explosives are concerned. Detonators (blasting caps) are the source of most accidents in this respect. Children are continually finding them, with tragic result, sometimes many years after they have been placed on a shelf in the garage or cached away on a beam in the barn. Of course many accidents of this sort are also caused by persons who regularly use explosives, such as contractors and their powdermen who fail to safe-guard explosives. Such negligence is criminally inexcusable. The following ten-year record is a warning in this regard:

### *Playing with Detonators*

	Accidents	Killed	Injured
1945.....	13	2	18
1946.....	10	0	10
1947.....	14	0	19
1948.....	14	0	19
1949.....	13	3	19
1950.....	11	0	13
1951.....	12	1	15
1952.....	8	1	14
1953.....	12	0	21
1954.....	14	0	20
Average for 10 years...	12·1	0·7	16·8
1955.....	11	0	17





## **A P P E N D I C E S**

## Explosives Division

### APPENDIX A

#### *Factories Licensed to manufacture Explosives, 1955*

Owner	Location of factory	General nature of product
Canadian Industries Ltd.....	Beloeil, Que.....	Blasting explosives, black powders, nitro-compounds.
Canadian Industries Ltd.....	James Island, B.C....	Blasting explosives.
Canadian Industries Ltd.....	Nobel, Ont.....	Blasting explosives.
Canadian Industries Ltd.....	Brainerd, Man.....	Blasting explosives.
Canadian Industries Ltd.....	Brownsburg, Que....	Ammunition, detonators, fusees, etc.
Canadian Industries Ltd.....	Seven Islands, Que...	Blasting explosives.
Canadian Industries Ltd.....	Calgary, Alta.....	Blasting explosives.
Canadian Safety Fuse Co. Ltd..	Brownsburg, Que....	Safety fuse, detonating fuse, fuse lighters.
*Canadian Arsenals Ltd.....	Beloeil, Que.....	Time ring fuse powder.
Canadian Arsenals Ltd.....	St. Paul l'Ermite, Que.	Filling military shells, fuses, etc.
Canadian Arsenals Ltd.....	Valcartier, Que.....	Filling military small arms ammunition.
Canadian Arsenals Ltd.....	Valleyfield, Que.....	Military explosives, propellants.
North American Cyanamid Ltd.	Niagara Falls, Ont....	Nitroguanidine.
T. W. Hand Fireworks Co. Ltd.	Cooksville, Ont.....	Fireworks and military pyrotechnics.
T. W. Hand Fireworks Co. Ltd.	Papineauville, Que...	Fireworks and military pyrotechnics.
Croname (Canada) Ltd.....	Waterloo, Que.....	Toy pistol caps.
Montreal Fireworks Displays and Manufacturing Company	Ville St. Pierre, Que..	Display fireworks.
W. F. Bishop & Son Ltd.....	Unionville, Ont.....	Fireworks.
Superior Toy Company.....	Dundas, Ont.....	Toy pistol caps.

\* Inactive.

### APPENDIX B

#### *Explosives Imported into Canada*

Class	Division	Description	Quantity
I	.....	Gunpowder.....	44,146 lb.
II	.....	Nitrate Mixtures.....	72,698 lb.
III	.....	Nitro-Compounds:—	
	1	Nitroglycerine Explosives.....	9,472 lb.
	2	(a) Propellants.....	10,607 lb.
		(b) For use in explosive factories.....	1,788,660 lb.
		(c) For other manufacturing purposes.....	3,732,644 lb.
V	1	Fulminates.....	600 lb.
VI	1	Primers.....	116,600 lb.
	1	Safety Cartridges.....	6,236,829 rounds.
	1	Safety Fuse.....	14,250 feet.
	2	Detonating Fuse.....	200,448 feet.
	2	Seismic Explosives.....	30,025 lb.
	3	Detonators.....	37,040
	.....	Miscellaneous.....	17,060 lb.
VII	2	Manufactured Fireworks.....	976,365 lb.



## APPENDIX C

## Part I

## Accidents Involving Explosives During the Calendar Year 1955

Circumstances or Cause	Mines and Quarries			Elsewhere			Total		
	Acci- dents	Kill- ed	In- jured	Acci- dents	Kill- ed	In- jured	Acci- dents	Kill- ed	In- jured
In Use.									
a Delaying too long in lighting fuse.....	3		4	3	3	1	6	3	5
b Premature firing of electrical blasts.....									4
c Not taking proper cover.....	3		3	1		1	4		
d Projected debris.....	3		3	9	2	7	12		10
e Returning too soon after blasting.....	3	1	2	3	1	3	6	2	5
f Improper handling of misfires.....	1		2				1		2
g Rough tamping.....				1	2	3	1		3
h Ignition of explosives by flames, sparks, etc...									
i Drilling into explosives.....	10	1	13	3			13	3	17
j Striking unexploded charge in removing debris.....	2	1	3				2	1	3
k Preparing charges.....	2		2	1	1		3	1	2
l Using too short a fuse.....	4		6				4		6
m Insufficient ventilation after blasting.....	2		2				2		2
n Springing shots.....									
o Inadequate guarding.....	1		1				1		1
p Various.....	4	1	6	1	1	1	5	2	7
Total.....	38	4	47	22	12	20	60*	16	67
In manufacture.....							25		13
In keeping.....									
In conveyance (by road).....							3		
Total.....							28		13
Miscellaneous									
(a) Misuse of detonators.....							11		17
(b) Misuse of other explosives.....							9	1	20
(c) Various.....							4	5	2
Total.....							24†	6	39
Total all circumstances.....	38	4	47	22	12	20	112	22	119

\* These accidents occurred in circumstances not directly controlled by the Act.

† Circumstances are given on the following pages.

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### APPENDIX C

#### Part II

#### Misuse of Detonators

Ref. No.	Cause of Accident	Killed	Injured
9	A nine-year-old boy lost the sight of his right eye and three fingers of his right hand when a detonator he had found blew up in his face. He had wired the detonator to his electric train and it exploded when he turned the switch. ....		1
12	Several children in a one-room school were probing copper detonators with wires when one of these exploded, resulting in injury to the fingers of the left hand of a teen-aged boy. One of the boys had found a rusted can containing detonators on an abandoned farm. ....		1
25	Four young boys found detonators and, being unaware of their danger, heated one with matches so the metal would sizzle when dropped into a water-filled ditch. The cap blew up in their faces but fortunately injuries were of a minor nature. ....		4
35	Seven young boys obtained detonators from an unattended truck where excavation and blasting activities were being carried out on road work. They built a fire and a detonator was thrown into the fire. Two of the boys suffered minor injuries when it exploded. ....		2
69	A 13-year-old boy seriously injured his right hand when a blasting cap he was holding exploded. This boy and his friend had stolen dynamite and caps from an insecurely locked box at a construction site. ....		1
82	A youth received minor injuries when he was playing with a detonator which exploded. ....		1
95	One boy was injured when he placed a detonator in a vice and sawed it with a hack saw. ....		1
110	Two youths received cuts and bruises when a cap exploded in their faces on coming into contact with a lighted match which was applied by one of the boys. ....		2
141	An 18-year-old Eskimo suffered numerous minor lacerations when two other Eskimos connected the wires of an electric detonator with a flashlight battery. ....		1
180	A thirteen-year-old boy and his eleven-year-old sister were seriously injured when a can containing detonator caps exploded. The boy had found the can and, thinking it contained nails, was attempting to open it with a hammer. ....		2
183	An adult was severely injured upon trying to open a rusted can of detonators with a metal bar, apparently just for curiosity. His right eye was blown out by the blast and the left eye was badly injured; his left hand was also badly injured. ....		1



*Misuse of other Explosives*

Ref. No.	Cause of Accident	Killed	Injured
<b>Home-Made Explosives</b>			
3	A 13-year-old boy had his thumb and part of his index finger blown off by the explosion of a home-made bomb which he had made with his chemistry set. He filled a metal pipe with a mixture of chemicals and was plugging one end with a piece of wood when the accident occurred. ....		1
28	The vocal cords of a teen-aged boy were shattered by the explosion of a home-made rocket which he was demonstrating to friends. The explosive mixture was contained in a steel cylinder about an inch in diameter. His two playmates sustained minor injuries. ....		3
145	A 15-year-old boy lost a thumb and one finger when a shell casing filled with home-made powder exploded. His two friends suffered only minor injuries. ....		3

**Fireworks**

38	A lighted firecracker dropped by youths into a manhole blew the cover off when leaking illuminating gas was ignited. Two boys suffered first degree burns and one sustained a fracture of the left ankle. ....		2
109	One man was killed and five other persons severely injured during an attempt to set off a fireworks aerial shell from a cast-iron pipe. The shell exploded in the pipe and blew it to pieces, resulting in death and injury to the persons in the immediate vicinity. ....	1	5
113	A teen-aged boy lost the sight of his right eye when a firecracker exploded belatedly. He and two friends were setting off firecrackers in bottles when one of them failed to explode; on his picking up the bottle, the cracker exploded, and he received the blast in his eye. ....		1
122	Exploding firecrackers resulted in burns and shock to an eight-year-old boy when they exploded in his pocket. Ignition resulted when a playmate put a lighted cracker in the pocket. The boy's leg was severely injured. ....		1
151	A youth sustained burns to his face and hands when a firework flared in his face as he picked it up. ....		1

**Gunpowder**

83	Three boys were burned, one seriously, while playing with gunpowder which had been given them for destruction by immersion in water. The person responsible was convicted under the Criminal Code and sentenced to a 14-day jail sentence. ....		3
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**Explosives Division**

*Misuse of other Explosives—Concluded*

Ref. No.	Cause of Accident	Killed	Injured
14	A man was seriously injured in what was apparently an attempt at assassination. A bomb, apparently wired to the ignition, exploded in his car.....	.....	1
54	Three civilians were killed and one injured, in the explosion of a rocket at the site of a military rocket range. They were trespassing in a prohibited area for the purpose of collecting scrap metal.....	3	1
118 and 148	Two cases of suicide by means of commercial explosives were reported.....	2	



## Authorized Explosives

### Canadian Industries Limited (Explosives Division)

AMEX (formerly BL-109)  
 Ammonia Dynamite—20, 25, 30, 35, 40, 50 and 60 per cent.  
 Ammonia Dynamite—55 per cent (for export only).  
 Ammonia Dynamite—Extra 20, 70 per cent (for export only).  
 Ammonia Dynamite quarrying—60 per cent.  
 Ammonia Gelatin—30, 35, 40, 50, 60, 75, 80, 90 per cent (for export only).  
 Black Blasting Powder.  
 Black Sporting Powder.  
 Blastol—60 per cent.  
 BRX-7—75 per cent.  
 BRX-7 (D.N.T.)—75 per cent.  
 Cilgel—50 per cent.  
 Cilgel—(D.N.T. or T.N.T.)—50 per cent.  
 C.I.L. Dynamite Nos. 2, 3, 4 and 5.  
 Cordite—MD, MDT, W, WT, WM, WMT.  
 C-X-L Dynamite—Nos. 1 and 5.  
 C-X-L Gelatin—Nos. 1 and 2.  
 C-X-L-ite.  
 Di-Drill Gelatin—60 per cent.  
 Ditching Dynamite—50 per cent.  
 Ditching Dynamite—(D.N.T.)—50 per cent.  
 Driftite—70 per cent.  
 Driftite (D.N.T. or T.N.T.)—70 per cent.  
 Dygel—75 per cent.  
 Dynamex (Diameters 1" to 1½" incl.)—40, 50, 60 and 70 per cent.  
 Dynamex (Diameters 1½" and over)—40, 50, 60 and 70 per cent.  
 EXEL-G—75 per cent (formerly BL-107).  
 EXEL-S—75 per cent (formerly BL-110).  
 Explosives BL-100—60 per cent.  
     BL-103  
     BL-106  
     BL-111  
 Forcite—30, 35, 40, 40 (Asbestos Corporation),  
     50, 60, 75, 75 (bagged), 80 and 90 per cent.  
 Forcite—(Brainerd Series)—30, 40, 50, 60 and 75 per cent.  
 Forcite—(D.N.T. or T.N.T. Series)—30, 35, 40, 40 (Asbestos Corp.)  
     50, 60, 75, 75 (bagged),  
     80 and 90 per cent.  
 Free Running Ammonia Dynamite—65 per cent.  
 Fuse Powders—30, 40, 44, 53, 57 and 65 seconds.  
 Gelatin Dough—90 per cent.  
 Gelatinized Dynamite—60, 75 per cent (for export only).  
 Geogel.  
 Gelignite—62 per cent.  
 Giant Gelatin—30, 35, 40, 50, 60, 75, 80 and 90 per cent.  
 Giant Gelatin (Brainerd Series)—40 and 60 per cent.  
 Giant Gelatin (D.N.T. or T.N.T. Series)—20, 25, 30, 35, 40, 50, 60, 75, 80 and 90 per cent.  
 Guhr Dynamite.  
 Guncotton.  
 Gunpowder.  
 Gypsumite "A", "B" and "C".  
 Hi-Velocity gelatin—60 and 80 per cent.  
 Liquid Nitroglycerine.  
 Lump-Kol Pellet Powder.  
 Monobel, Nos. 4, 6, 7, 10, 11 and 14.  
 Monobel, sheathed—Nos. 4, 7 and 10.

## Explosives Division

### *Authorized Explosives—Continued*

#### *Canadian Industries Limited (Explosives Division)—Concluded*

Monobel, X (E.Q.S.).  
Nitrocotton.  
Nitrone T-4.  
Nitrone T-1 (3 formulae).  
Nitrone S-1.  
Nitrone S-1 Primer.  
Nitrone Primer.  
Nitropel.  
Nitrox.  
Pellet Powder No. 2.  
Polar Stumping Powder—20 per cent.  
Signal Bombs.  
Semi-Gelatin No. 1.  
S.N.G.  
"Special No. 1" Dynamite.  
Special Gelatin—60, 75, 80, 90 per cent (for export only).  
Stopeite—20, 25, 30, 35, 40, 50, 55 and 60 per cent.  
Straight Dynamite—20, 25, 30, 35, 40, 50, 60 per cent (for export only).  
Straight Gelatin—25, 30, 35, 40, 50, 60, 75, 80 per cent (for export only).  
Submagel—60, 75 and 95 per cent.  
Trinitrotoluene.  
Vibrex—60 per cent.

#### *Canadian Safety Fuse Co. Ltd.*

"B-Line" detonating fuse.  
Safety fuse—"Beaver" Brand.  
Safety fuse—"Black Clover" Brand.  
Safety fuse—"Black Pacific" Brand.  
Safety fuse—"Clover" Brand.  
Safety fuse—"Crown" Brand.  
Safety fuse—"Moose" Brand.  
Safety fuse—"Pacific" Brand.  
Safety fuse—"White Jacket" Brand.  
Safety fuse—"Yellow Jacket" Brand.  
Hot Wire Fuse Lighters.  
Igniter Cord—"Thermalite" Brand. Types A and B.  
"Primacord" Detonating Fuse.

#### *Canadian Industries Limited (Ammunition Division)*

Ammunition.  
Detonators.  
Dextrinated Lead Azide.  
Fuse Igniting and Connecting device.  
"Lead Salt".  
Lead Styphnate (Normal).  
Percussion Caps.  
Railway Fusees.  
Railway Torpedoes.  
Safe-T-Lite Highway Fusee.  
Styphnic Acid.  
Tetrazene.  
Igniter Cord Electric Starter.  
"Primacord" MS Connector.



***Authorized Explosives—Continued***

*North American Cyanamid Ltd., Niagara Falls, Ont.*

Nitroguanidine.

Authorized explosives manufactured by other than Canadian firms:—

*Aerojet Engineering Corporation, Azusa, Calif.*

Aeroplex AK14 Propellant.

*Aktiebolaget Bofors, Nobelkrut, Bofors, Sweden.*

Smokeless Sporting Powder.

Detonating Fuse, (Bofors type).

*American Cyanamid Co., Latrobe, Penn.*

Fulminate of Mercury.

*Atlas Diesel Co., Stockholm, Sweden.,*

Engine Starting Cartridges (including Ignition Papers and Caps).

*Atlas Powder Co., Wilmington, Del.*

Shaped Charges.

Detonators (Blasting Caps).

*Austin Powder Co., Cleveland, Ohio.*

Black Pellet Powder.

*Leon Beaux & Co., Societa Italiana Munizioni, Milano, Italy.*

Small arms ammunition.

*Bermite Powder Co., Saugus, Calif.*

Baker Power Charge No. 661.

Firing Head Igniter—Product No. 660.

*Cardox Corporation, Chicago, Ill.*

Cardox.

Cardox Heaters.

*Cartoucherie Française, Paris, France.*

.22 Blank Cartridges.

*Central Railway Signal Company, Boston, Mass.*

Railway Torpedoes.

*De Kruithoorn N.V. Nederlandsche Jachtpatroonfabriek's Hertogenbosch, Holland.*

Shotgun Shells 12, 16, 20 gauge.

*E. I. DuPont de Nemours & Company, Inc., Wilmington, Del.*

Auxiliary Charges C. 63.

Detonators.

DuPont Bulk Powder.

## Explosives Division

### *Authorized Explosives—Continued*

#### *E. I. DuPont de Nemours & Company, Inc., Wilmington Del.—Concluded*

DuPont Pistol Powder No. 6.  
Explosive Rivets.  
Fulminate of Mercury.  
High Temperature E.B. Caps, No. 6.  
Improved Military Rifle Powders.  
Jet Tappers.  
Oil Well Explosives S.O.W.E. No. 1 and EL-431-A.  
"Nitramex" No. 2.  
"Nitramon S".  
"Nitramon S" Primers.  
Nitrocellulose.  
Nitrostarch.  
Open hole Shaped Charges (R.D.X. or Pentolite).  
P. 6 Seismograph Booster.  
"Pelletol" Nos. 1 and 2.  
Perforating Shaped Charges (R.D.X. or Pentolite).  
P.E.T.N.  
"Primacord" Booster.  
Pyro (ground smokeless) Powder.  
R.D.X. Cord.  
Smokeless Powders.  
Sporting Rifle Powders.  
Tetryl.  
Waterproof Boosters C. 66.

#### *Dynamit-Actien-Gesellschaft, Nurnberg 2, Germany.*

RWS—Flobert Blank Cartridges.  
No. 6 Detonators (copper case).  
No. 7 Detonators (copper case).  
No. 8 Detonators (copper case).  
No. 6 Detonators (aluminum case).  
No. 7 Detonators (aluminum case).  
No. 8 Detonators (aluminum case).  
Delay Electric Detonators, 0-10, No. 8 (copper case).  
Delay Electric Detonators, 0-10, No. 8 (aluminum case).  
Millisecond Delay Electric Detonators, 0-10, No. 8 (copper case).  
Millisecond Delay Electric Detonators, 0-10, No. 8 (aluminum case).  
Detonating Fuse "Nobel Cord".  
R.W.S. Rimfire Cartridges.

#### *Ellefsens Tendskruefabrikk, Stokke, Norway.*

Time Fuses and Detonators for Whaling Guns.

#### *Ensign Bickford Company, Simsbury, Conn.*

Ignitacord.  
"Primacord-Bickford" Fuse.

#### *ETS. Brandt, La Ferte St. Aubin (Loiret), France.*

Shaped Charges 3 $\frac{3}{8}$ " and 5".

#### *ETS. Billant, Usine Du Prado, Bourges 9 (Cher), France.*

Shaped Charges 3 $\frac{3}{8}$ ".

***Authorized Explosives—Continued***

*Federal Cartridge Corporation, Minneapolis 2, Minn.*

Shotgun Cartridges.

*Federal Laboratories, Pittsburgh, Pa.*

Lachrymatory Cartridges.

Powder Loads.

*Gevelot, S.A., 50 Rue Ampere, Paris 17, France.*

Shotgun Cartridges.

*Giullio Fiocchi, Lecco, Italy.*

Power Tool Cartridges, Q 4.

*Charles Hellis & Sons Ltd., London, England.*

12 gauge Shotgun Shells.

*Hercules Powder Company, Wilmington, Del.*

Detonators.

Gelatin Oil Well Explosives.

Nitrocellulose.

Smokeless Powders.

Vibro Caps.

Vibrogel B and 3.

*Hull Cartridge Co., Hull, Yorkshire, England.*

Shotgun Cartridges, 12 gauge.

*Illinois Powder Manufacturing Co., St. Louis, Mo.*

"Western Spiral-Pack" Electric Detonators.

Gold Medal Oil Well Explosive 100 per cent.

*Imperial Chemical Industries Limited, England.*

Cerium Low Tension Fuseheads.

Detonating Relays.

Percussion Caps.

*Jet Guns Company, Neil P. Anderson Bldg., Fort Worth, Texas.*

Shaped Charges,  $1\frac{3}{4}''$ ,  $2\frac{3}{8}''$ .

Glass Gun Jet Perforating Charges, G.G.2, G.G.4, G.G.7.

*Kemod Manufacturing Co. Inc., New York, N.Y.*

"Quik-Shot" Cartridges.

*Kilgore Manufacturing Company, Westerville, Ohio.*

Flashlight Cartridges.

*King Powder Co., Cincinnati, Ohio.*

Black Pellet Powder.



## **Explosives Division**

### *Authorized Explosives—Continued*

*Lake Erie Chemical Co., Cleveland, Ohio.*

Lachrymatory Cartridges.

*Lane-Wells Co., Los Angeles, Calif.*

Gun Perforator Cartridges.

*Mid Continent Torpedo Co. Ltd., Tulsa, Okla.*

Red Head Firing Heads.

*Olin Mathieson Chemical Corp., East Alton, Ill.*

Cyclonite.

"Western" Small Arms Ammunition.

"Winchester" Small Arms Ammunition.

Normal Lead Styphnate.

*Pacific Railway Signal Co., Peru, Ind.*

Railway Torpedoes.

*Patronenfabrik, A. G., Solothurn, Switzerland.*

Safety Cartridges, 7·5 mm.

*Perforating Guns Co., Inc. Houston, Texas.*

Jet Perforating Charges.

*Poudreries Nationales, France.*

D-2 Propellant Powder.

*Pringle Powder Company, Bradford, Pa.*

Liquid Nitroglycerine.

*Remington Arms Co. Inc., Bridgeport 2, Conn.*

Stud Driver Cartridges.

"Remington" Small Arms Ammunition.

"Peters" Small Arms Ammunition.

"Springfield" Small Arms Ammunition.

*F. J. Roberts Squib Company, Punxsutawney, Pa.*

Miners' Safety Squibs.

*Rohm-Gesellschaft, Sontheim/Brenz, Kreis Heidenheim, Germany.*

6 mm Blank Cartridges.

RG-3 Signal Cartridges.

*Shaped Charge Explosive Manufacturers, Inc., Martinsburg, W. Va.*

Plurajet Blasting Units (Not for underground use).

*Trojan Powder Company, Allentown, Pa.*

Nitrostarch.

***Authorized Explosives—Concluded***

*Western Cartridge Company, East Alton, Ill.*

Detonators.  
Kiln Gun Shells.  
Western Ball Powder.

*Winchester Arms Company, Cleveland, Ohio.*

"Tempotool" Cartridges.

## Explosives Division

### *Authorized Manufactured Fireworks*

Fireworks manufactured by the following Canadian makers are authorized:

W. F. Bishop & Son Limited, Toronto, Ont.  
Canadian Industries Limited.  
Canadian Safety Fuse Company Limited, Brownsburg, Que.  
Croname (Canada) Ltd., Waterloo, Que.  
Dominion Fireworks Co. Ltd., Dixie, Ont.  
T. W. Hand Fireworks Co. Ltd., Cooksville, Ont.  
T. W. Hand Fireworks Co. Ltd., Papineauville, Que.  
Montreal Fireworks Displays and Manufacturing Company, Ville St. Pierre, Que.  
Superior Toy Co., Dundas, Ont.

Certain fireworks manufactured outside of Canada by the following makers are authorized.\*

Acme Fireworks Corporation (Acme Novelty Manufacturing Company) River Grove, Ill.  
Aerial Products Incorporated, Merrick, Long Island, N.Y.  
American Railway Signal Company, Fostoria, Ohio.  
Anthes Force Oiler Company, Fort Madison, Iowa.  
Astra Fireworks Ltd., London, England.  
Atlas Fireworks Co. Inc., Los Angeles 22, Calif.  
M. Backes' Sons Inc., Wallingford, Conn.  
J. G. W. Berchkholtz, Hamburg-Bahrenfeld, Germany.  
Hermann Bischoff, Bremen, Germany.  
Oswald Bradley Ltd., Southport, Lancs., England.  
C. T. Brock & Co., Hemel Hempstead, Herts, England.  
Brookside Pyrotechnic & Chemical Co. Elkton, Md.  
Central Railway Signal Company, Boston, Mass.  
EM-GE Sportgerate K-G Gerstenberger & Co., Wurttemberg, Germany.  
J. Halpern Co., Pittsburgh, Pa., Distributors for Lenover Corporation, Chester, Pa., and Lenover, Pa.  
Thos. Hammond & Company, Craigmillar, Edinburgh, Scotland.  
Hitt Fireworks Company Limited, Seattle, Wash.  
Hudson Fireworks Display Company, Hudson, Ohio.  
Interstate Fireworks Manufacturing and Display Company, Bridgewater, Mass.  
Japan Fireworks Trading Company Ltd., Tokyo, Japan.  
Jatina Manufacturing Co. Inc., Mount Vernon, N.Y.  
Kilgore Manufacturing Company, Westerville, Ohio.  
Lakeside Railway Fusee Company, South Beloit, Ill.  
Lenover Corporation, Chester, Pa., and Lenover, Pa., J. Halpern, Pittsburgh, Pa., Distributors.  
Oscar Lunig, Stuttgart-Mohringen, Germany.  
Marutamaya Ogatsu Fireworks Co., Tokyo, Japan.  
C. Schauer Nachfolger, Berlin, Germany.  
National Fireworks Incorporated, West Hanover, Mass.  
New Jersey Fireworks Mfg. Co. Inc., Elkton, Md.  
Pacific Railway Signal Co., Peru, Ind.  
N. V. Pyro, Klazienaveen, Holland.  
Pyrotechnischen Fabriken, Wuppertal-Ronsdorf, Germany.  
Pyrowerk, Hamburg-Neugraben, Germany.  
Reliance Snap Company, Bishops' Stortford, Herts, England.  
Richard Appel's Jo King, New York 12, N.Y.  
Saburo Inagaki, Ikazaki City, Japan.  
Saburo Ishibashi, Tokyo, Japan.  
Schermuly Pistol Rocket Apparatus Ltd., Newdigate, Surrey, England.

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\* A list of authorized fireworks is on file in the office of the Explosives Division. Information may be obtained on request.



***Authorized Manufactured Fireworks—Concluded***

Standard Fireworks Limited, Huddersfield, England.  
Standard Railway Fusee Corporation, Boonton, N.J.  
Stehling and Co., Hamburg 11, Germany.  
The J. & E. Stevens Sales Co., New York.  
Superior Signal Co. Incorporated, South River, N.J.  
United Fireworks Manufacturing Company, Dayton, Ohio.  
U.S. Fish and Wildlife Service, Pocatello, Idaho.  
Van Karner Chemical Arms Corporation, New York.  
Joseph Wells & Son Limited, Dartford, Kent, England.  
Joh. Chr. Wendt, Hamburg, Gr. Borstel, Germany.  
Wunderkerzen-Werk Carl Flemming, Hamburg-Neugraben, Germany.  
Yuji Node, Shimozuma-Machi, Makabe-Gun Ibaragi-Prefecture, Japan.

Chinese firecrackers with gunpowder composition and not exceeding 4" in length and  $\frac{1}{8}$ " in diameter, and small Chinese fireworks, are authorized when found to function satisfactorily on examination at port of entry.













EDMOND CLOUTIER, C.M.G., O.A., D.S.P.  
QUEEN'S PRINTER AND CONTROLLER OF STATIONERY  
OTTAWA, 1956